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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/508,322	03/09/2000	JOHN DAVID HOLME	22815USA	9705

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EXAMINER

WILKINS III, HARRY D

ART UNIT	PAPER NUMBER
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1742

DATE MAILED: 05/27/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/508,322

Applicant(s)

HOLME, JOHN DAVID

Examiner

Harry D Wilkins, III

Art Unit

1742

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 05 May 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-4 and 7-14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 7-14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

**DETAILED ACTION**

***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114 was filed in this application after appeal to the Board of Patent Appeals and Interferences, but prior to a decision on the appeal. Since this application is eligible for continued examination under 37 CFR 1.114 and the fee set forth in 37 CFR 1.17(e) has been timely paid, the appeal has been withdrawn pursuant to 37 CFR 1.114 and prosecution in this application has been reopened pursuant to 37 CFR 1.114. Applicant's submission filed on 5 May 2003 has been entered.

***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-4 and 7-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lawrence et al (US 5,948,353) in view of Applicant's admission of prior art and further in view of Madsen (GB 737,510).

Lawrence et al teach a disc brake rotor made of gray cast iron. Lawrence et al teach (see col 1 line 57 to col 2 line 5) that the composition contains 0.5 to 1.0 wt% copper and contains "carbide forming metals" including titanium and vanadium. Carbides are well known in the art to increase hardness and wear resistance.

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Lawrence et al teach a broad range of less than 1 wt% of vanadium, however, it would have been within the expected skill of a routineer in the art to have optimized the content of vanadium to between 0.35 and 0.45 wt%, which is within the specified range of Lawrence et al, in order to maximize hardness and wear resistance. Lawrence et al teach a broad range of less than 1 wt% of titanium.

Applicant admits as prior art (see page 3, second paragraph) that it was well known in the art at the time of the invention that titanium contents below 0.1 wt% promoted graphitization and form hard particles of titanium carbonitride. Also known was that when the titanium content was above 0.05 wt% that cast irons became difficult to machine.

Therefore, it would have been obvious to keep the titanium content of the cast iron of Lawrence et al to a level below 0.05 wt% in order to reduce difficulty in machining because it was well known in the art to do so as admitted as prior art by Applicant. It would have been within the expected skill of a routineer in the art to have optimized the content of titanium in the range of less than 0.05 wt% to create a cast iron with maximum hardness and wear resistance.

Lawrence et al do not teach or suggest that the content of copper should be related to the content of hard carbide forming elements, such as titanium and vanadium.

Madsen teaches (see page 1, line 66) that the copper content of a cast iron can be limited by the amount of carbide forming elements, such as vanadium, present in the alloy.

Therefore, it would have been within the expected skill of a routineer in the art to have optimized the known result effective variable of the ratio of copper to the carbide forming elements, as disclosed by Madsen, in order to maximize the hardness and wear resistance of the cast iron of Lawrence et al.

Regarding claim 9, in addition to the above, Lawrence et al teach (see col. 4, lines 1-9) including 3.45-3.65 wt% C, 1.5-2.0 wt% Si, 0.6-0.9 wt% Mn, less than 0.12 wt% S and less than 0.15 wt% P.

Regarding claims 2 and 10, Lawrence et al teach that the composition also includes chromium at 0.2 to 0.5 wt%.

Regarding claims 3 and 11, it would have been expected by one of ordinary skill in the art that once the optimization of known result effective variables had occurred that the amount of vanadium would have been less than half the content of copper plus twenty times the content of titanium because once the ratio of copper to carbide forming elements had been established, the content of vanadium would have been less than one half of the copper content.

Regarding claims 4 and 12, Lawrence et al teach that the composition includes more than 3.40 wt% carbon, 1.0 to 2.5 wt% silicon and less than 0.15 wt% phosphorous which means that the carbon equivalents have a minimum of 3.733 which overlaps the claimed range.

Regarding claims 7 and 13, Lawrence et al teach that copper can be included in the range of 0.7 to 0.9 wt%. Therefore, it would have been within the expected skill of a

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routinier in the art to have optimized the content of copper in order to maximize the hardness and wear resistance.

Regarding claims 8 and 14, it would have been expected by one of ordinary skill in the art that once the optimization of known result effective variables had occurred that the amount of vanadium would have been less than half the content of copper plus twenty times the content of titanium because once the ratio of copper to carbide forming elements had been established, the content of vanadium would have been less than one half of the copper content.

The effective filing date of Lawrence et al is based upon the provisional application which contains all of the specifications relied upon in this rejection.

This rejection can be rebutted by a showing of evidence that the present invention produces unexpected results within the narrow claimed range. Applicant should submit data showing that the claimed invention produces unexpected results within the claimed ranges of vanadium and/or titanium. This can be done by showing that when compared to the closest prior art, which would be the base composition with V and Ti at less than 1 wt% and less than 0.05 wt%, respectively, but outside the presently claimed range, the present invention produces unexpected properties. For example, by using the first illustrative example from the application (page 5), if it were shown that when the cast iron contains about 0.3 and about 0.5 wt% vanadium, the cast iron does not produce the results of the present invention, the prima facie case of obviousness would be rebutted. Alternatively, if it were shown that when the cast iron

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contains about 0.02 and about 0.04 wt% titanium, the cast iron does not produce the results of the present invention, the prima facie case of obviousness would be rebutted.

Unexpected results must be established by factual evidence. Mere argument or conclusory statements in the specification does not suffice. *In re De Blauwe*, 736 F. 2<sup>nd</sup> 69, 705, 222 USPQ 191,196 (Fed. Cir. 1994).

### ***Conclusion***


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harry D Wilkins, III whose telephone number is 571-272-1251. The examiner can normally be reached on M-Th 10:30am-9:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V King can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Harry D Wilkins, III  
Examiner  
Art Unit 1742

hdw

ROY KING   
SUPERVISORY PATENT EXAMINER  
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